

**APPLICATION FOR  
UNITED STATES LETTERS PATENT  
SPECIFICATION**

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TO ALL WHOM IT MAY CONCERN:

Be it known that FUZHONG YANG, a resident of Shenzhen, the P. R. CHINA, and  
FAYONG CAI, a resident of Shenzhen, the P. R. CHINA have invented a new and useful A  
TELEVISION SYSTEM WITH DIGITAL SOUND of which the following is a specification.

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Anne E. Regnier

# A Television System with Digital Sound

## TECHNICAL FIELD

The present invention relates to an audio/visual apparatus, in particular, a digital sound television system that uses a color television to produce digital sound.

## BACKGROUND

For many years, television is a product that is mainly used to process visual frequency to present pictures; its accompanying sound system is a subordinate function and cannot be used independently. Along with rapid development of audio/visual technology, more and more audio/visual products enter into ordinary families. Most users have both color television and disk player. However, many users hope to appreciate Hi-fi music with color television set at their leisure, such as CD music, even no sound equipment is equipped with the television, but prior art color television cannot do it.

## DESCRIPTION

The present invention is to provide a digital sound television system that may generate digital sound with a color television.

The present invention includes a color television and at least a pair of three-stage frequency-splitting column sound boxes with three speakers. The present invention is characterized that the digital sound television system includes a front amplifier arranged in the control circuit inside the color television and the accompanying sound of the stereo is outputted to at least one pair of the column sound boxes by a power amplifier already in the color television.

A plurality of speakers of the pair of column sound boxes may be built in the color television to form integral speaker device.

The integral speakers may be those for a surrounding stereo sound box.

*Special*  
The present invention is characterized that the color television system integrates visual frequency and digital sound technologies. In addition to be an accompanying sound system of the television, the color television system may be served as independent sound equipment. Meanwhile, the scanning section of the color television may be turned off to stop operation of inflexion and high-voltage units, thereby saving energy, maintaining and extending the life of the kinescope and the control circuit of its scanning section. The digital sound color television system reproduces various sound field effects perfectly once it is coupled to disk players such as CD, VCD, SYCD, DVD, and digital recorder. It is a modern product integrating

color television and digital sound equipment.

~~The advantage of the digital sound color television system are to digitalize accompanying system of a color television to provide a Hi-fi sound effect; to serve as family sound system independently even the monitor is shut down; saves space and render simple operation in comparison with prior art combination sound equipment; to greatly enhance source sharing rate; and to bring into full use of room space.~~

## BRIEF ILLUSTRATION OF DRAWINGS

Detailed explanation of the structure, characteristics, and functions of the present invention is given in combination with attached drawings:

FIGURE 1 is a front view of the first embodiment of the present invention;

FIGURE 2 is a top view of the first embodiment of the present invention;

FIGURE 3 is a front view of the second embodiment of the present invention;

FIGURE 4 is a sectional view along line A-A of the second embodiment of the present invention;

FIGURE 5 is a block diagram of the present invention;

FIGURE 6 is a sound circuit of the present invention; and

FIGURE 7 is a flow chart of the control process in accordance with the present invention.

## PREFERRED EMBODIMENTS

Figs. 1, 2, and 5 show a front view and a top view of the external sound box of first embodiment in accordance with the present invention. The present invention includes color television 1 and at least one pair of three-stage frequency-splitting column sound boxes 2 that are arranged on both sides of the color television with each having three speakers. A front amplifier 4 is arranged in the control circuit in the color television 1 for digital signal processing, such as pitch control over sound signal. The sound signal from the color television or other sources is amplified by amplifier 5 for left channel, power amplifier 6 for right channel (maximum amplification value of each amplifier is 12W), and a woofer amplifier 7 (maximum amplification value of the amplifier is 16W). The amplified sound signal then is coupled to the pair of three-stage frequency-splitting column stereo boxes 2 arranged outside color television 1. The sound boxes may be built in inside or outside.

Figs. 3 and 4 show a front view and sectional view along A-A line of the second embodiment of the present invention. A pair of speakers is built in the color television 1. Thus, a compact space is provided and the integral speakers may be those for surrounding stereo. The control circuit of the second embodiment is almost the same with that of the first embodiment, e.g., a front amplifier 4 is arranged in the control circuit of color television 1 for digital signal processing, such as pitch control over sound signal. The sound signal from the color television or other sources is amplified by power amplifier 5 for left channel, power amplifier 6 for right channel, and a woofer amplifier 7. The amplified sound signal is then coupled to the pair of three-stage frequency-splitting column stereo boxes in the color television 1, as shown in FIG. 5.

Referring to FIG. 6, it shows the sound circuit of the present invention, which operation is as follows:

1. When a remote controller switches to sound/television mode, microprocessor MCU sets STB register of on-chip processor TDA8841 at 0 through I<sup>2</sup>C bus, enabling TDA8841 at Standby mode. Then, horizontal drive output is open at pin No. 40 so that horizontal activation stops. To assure horizontal drive stage inactivation, pin No. 8 of microprocessor MCU sends a high level through Q212 to ground the base of transistor for the horizontal drive, resulting in horizontal output level to be cut off, no high-voltage supplied, and finally, operation of scanning circuit is terminated.

2. Microprocessor MCC sets up parameters of sound modes, tenor, bass, and sound volume by digital sound processing chip TDA9859 of I<sup>2</sup>C bus. After obtaining proper advance audio signal, stereo power amplifier TDA2616Q and woofer power amplifier TDA2009A are driven. At last 3D space sound field effect such as surrounding stereo sound is reproduced through loudspeaker system.

3. In operation, in order to enable users to choose sound effect on CRT screen by interactive interface, the machine actually implements the second part before performing the first part.

Since only accompanying sound channel works under sound television mode, the 100W power for scanning circuit and high-voltage circuit is saved. Thus, the present invention consumes only about 30W power, which shows that the digital sound television system in accordance with the present invention is a green appliance.

FIG. 7 shows flow chart of the operation in accordance with the present invention. The audio signal source is coupled to the television system in accordance with the present invention and television is turned on, so the television enters into "television reception state". To appreciate CD sound, "sound key" is pressed to

switch the television into sound state mode, then, the menu "sound setup" appears on the screen. Then, users may operate step by step according to directions of the menu (switch automatically to next page of the menu three seconds after). First, audio signal (AYZ) is inputted, then sound parameters including volume, bass, tenor, balance, woofer, and sound effect (concert hall, studio, square, stereo, surrounding sound) are set up. Sound key is pressed for continuously three minutes to close scanning circuit and display circuit. At this time, the television is shut down and "sound state" genuinely comes out; meanwhile, LED indicating sound state lights up. Then, only sound is displayed. Sound volume, effect, and pitch during listening may be adjusted with corresponding keys on the remote controller. Then, LED on television lights up as reply. A MUTE key may be pressed to stop listening temporarily. To enter into television state again, press down channel+/- key or digital key on the remote controller. Then, the television system in accordance with the present invention automatically enters into channel 1 to receive and display a television program.

Operation of the television system in accordance with the present invention under television state is identical with that of traditional color television, so its explanation and introduction is not described here.